CAIT
Center for Advanced Infrastructure & Transportation
Rutgers, The State University of New Jersey

NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT

Project Title:	Use of LED or Other New Technology to Replace Standard Overhead & Sign Lighting
RFP NUMBER:	NJDOT RESEARCH PROJECT MANAGER: Ed Kondrath
TASK ORDER NUMBER: 148 / 4-29090	PRINCIPAL INVESTIGATOR: Pat Szary
Project Starting Date: 1/1/2004 **Original** Project Ending Date: 12/31/2004 **Modified Completion Date:**	Period Covered: 4th Quarter 2004

Task	% of Total	% of Task this quarter	% of Task to date	% of Total Complete
Literature Search	5%	0%	100%	5%
1. Comprehensive Literature Review	20%	30%	100%	20%
2. Develop a Cost Benefit Model	30%	5%	83%	25%
3. Experimental Process & Implementation	25%	20%	70%	17.5%
4.Analysis of Experimental Data	15%	10%	10%	1.5%
Final Report	5%	0%	0%	0%
TOTAL	100%			69 %

Project Objectives:

The goal of this study is to provide NJDOT with information concerning the replacement of standard overhead and sign lighting with LED or new technology. The study should meet four basic objectives:

1. Reduce operating costs while upholding the quality of the roadway environment, in relationship to nighttime visibility.
2. Provide NJDOT with the information such that they can substitute out-of- date technology with newer, more efficient lighting equipment such as sulfur light, bright white LED light, QL lighting, and other technologies.
3. Supply NJDOT with a lighting plan that is able to offer equal or better illumination with significantly lower energy consumption and cost.
4. Establish a lamp replacement, cleaning, and equipment maintenance schedules that ensure quality lighting while enabling NJDOT maintenance staff to focus on higher priority tasks.

Project Abstract:

The research team will gather information on existing bulbs and hardware commonly used by NJDOT. This information will help to establish a baseline for the cost/benefit analysis. This study will include systems such as overhead street lamps and roadside signboards that are illuminated. A comparison will be made between the different lighting technologies presently used as well as those identified in the literature search that may not yet be mainstream. All bulbs will be compared in a performance test to determine their respective efficiencies. Bulb recommendations will be made after analyzing results on specific criteria (power consumption, illumination, durability, bulb life, etc.) The data collected in the research phase of the study will be compared to that found in the literature review, to assist in the verification and evaluation of experimental results. Bulb comparison is discussed in more detail as part of the Phase II section of this proposal. The overall testing procedures for the bulbs will be determined as a part of Task 2, thus addressing any special problems specific to individual technologies.

1. Progress this quarter by task:

- A meeting was setup up with Dan Black of Dot to discuss the testing plan which included lamp evaluation and site layout. It was mutually decided to conduct the testing in the DOT parking lot next to the F&A

building. Specific light poles were selected for the testing. One 26 foot pole and one 40 foot pole in the center of the parking will be used. A field trip was made in mid November at night to evaluate the suitability of the site selected. It was noted that after removing fuses to shut off all the surrounding lights that some background lighting from the street and the parking lot could interfere with the testing. Dan Black was contacted to see if he could remove the two lamps that posed a potential problem.

- The Layout for the test grid was setup in the parking lot every pole length in the X and Y direction for each lighting fixture. A calibrated Light meter was used to collect base line data on the standard lamps that the department uses. This will allow us to compare the foot candle curves supplied with the fixtures with actual in field measurements. Only partial foot candle curves will be taken to validate the foot candle curves supplied by the manufactured.

- Tests will be conducted to compare the standard hid lamps to lower wattage hid hps ultea white lamps. These lamps produce 3 times the color rendering due to a special coating. This test is being done to see if lamp wattage can be reduced by one third and still provide the visible light needed. Tests will also be conducted to determine if better visible light is produced for the same wattage.

- Dot Supplied standard cobra head fixtures have been retro fitted with the QL and Icetron lamps. Rutgers will document the process for conversion in the field and cost benefit of retro fit vs. purchased dedicated fixtures

2. Proposed activities for next quarter by task:
   - Continue implementation plan and data collection
   - Install lamps at DOT maintenance yard for evaluation with DOT personnel
   - Install and evaluate solar lighting technology and led lamps

3. List of deliverables provided in this quarter by task (product date):
   - Completed list of lamp types set for evaluation
   - Setup of testing fixtures at DOT in Ewing
   - Retrofit DOT supplied fixtures with QL and Icetron lamps
   - Layout and conduct tests of various lamps
   - Schedule meeting with Phillips and tour lighting facility
   - Order special led, QL and Icetron fixtures

4. Progress on Implementation and Training Activities:
   - N.A.

5. Problems/Proposed Solutions: Some delays were encountered this quarter in obtaining led lamps, QL and Icetron fixtures. Delays were encountered in setting up the test site due to light infiltration into testing site from lights outside the test area. Dan Black Is working on removing the lamps temporarily until testing has been completed . Due to the Thanksgiving Holiday Dan was unable to have the electrical maintenance personnel rewire the mast heads on two of the testing poles which would allow for changing lamps without changing lamp heads.

Total Project Budget	$146,000
Modified Contract Amount:	
Total Project Expenditure to date	$20,790
% of Total Project Budget Expended	14%

* These are approximate expended amounts for the project; these estimates are for reference only and should not be used for official accounting purposes. For a more accurate project accounting please review the quarterly invoice for this project.